CLAIMS

We claim:

1. A method of operating an automated, continuous, and random access analytical system capable of simultaneously effecting multiple assays of a plurality of liquid samples, said method comprising the steps of:

a. placing said samples onto said system;

b. scheduling various assays of said plurality of liquid samples;

c. preparing at least one unit dose disposable for each sample placed onto said system by transferring an aliquot of said sample to at least a first reaction chamber and a second reaction chamber located in a reaction vessel having a plurality of separate and independent reaction chambers, wherein each chamber is capable of receiving a liquid sample and one or more assay reagents;

d. incubating said suspensions; and

e. analyzing said suspensions independently and individually by at least two different assays that have been scheduled previously in step b, wherein one of said assays is a turbidimetric assay and another of said assays is a fluorescent assay.

2. A method according to claim 1, wherein said analyzing step e further comprises the use of multiple wavelength optics.

3. A method according to claim 2 wherein at least two wavelengths are used to conduct said analysis.

4. A method according to claim 2 wherein at least three wavelengths are used to conduct said analysis.

5. A method according to claim 1, wherein said assay reagent is maintained in dried form until it is re-hydrated prior to admixture with said sample.

6. A method according to claim 1 wherein said fluorescent assay is a fluorogenic assay or a fluorometric assay.

7. A method according to claim 1 wherein said turbidimetric assay is a colorimetric assay.

8. A method according to claim 7 wherein said colorimetric assay is a bichromatic colorimetric assay.

9. A method according to claim 1 wherein said reaction vessel comprises a modified clear plastic sample tray.

10. A method according to claim 9 wherein said modification comprises the opacification of a portion of the surface of said sample tray.

11. A method according to claim 10 wherein said modification comprises the colorization of a portion of the surface of said sample tray.

12. A method according to claim 1 wherein said scheduling step b is carried out on a computer.

13. A method according to claim 1 wherein said scheduling of said assays occurs prior to performance of said assays, each assay having a test definition containing several timing parameters with each activity of said assay containing time values to determine which resources of said system are required and which activity is required by each of said assays, and which time values are needed by said resources.

14. A method according to claim 13 wherein at least one of said assays utilizes the algorithm outlined in Figure 1 in the determination of incubation time.

15. A method according to claim 14 wherein said algorithm interacts directly with a computer processing unit (CPU) controlling said scheduling.

16. A method according to claim 15, wherein said CPU is located on board said system.

17. A method according to claim 1 wherein all steps following step a are carried out automatically.

18. A method according to claim 1 wherein at least one of said assays is an assay to determine the presence and identity of any microorganism in said sample.

19. A method according to claim 1 wherein at least one of said assays is an assay to determine the presence and susceptibility to antimicrobial agents of any microorganism in said sample.

20. The method of claim 1 wherein said predetermined conditions in step d comprise an incubation time of about 15 minutes to about 8 hours.

21. The method of claim 1 wherein said assays are performed at a temperature in the range of about 25°C to about 37°C.

22. A method for simultaneously determining the identity of and susceptibility to antimicrobial agents of clinically significant microorganisms, comprising the steps of:

a. suspending and homogeneously mixing a volume of microorganism-containing sample into an aqueous medium to prepare an inoculum;

b. admixing said inoculum with growth supporting medium to form a test sample;

c. introducing a predetermined amount of said test sample into a first receptacle within a solid support;

d. introducing a predetermined amount of said test sample into a second receptacle within a solid support;

e. admixing a first assay reagent with the test sample in said first receptacle to form a homogeneous suspension prior to conducting a first assay;

f. admixing a second assay reagent with the test sample in said second receptacle to form a homogeneous suspension prior to conducting a second assay;

g. incubating said samples under predetermined conditions;

h. analyzing said suspensions independently and individually by at least two different assays, wherein one of said first and second assays is a turbidimetric assay and the other is a fluorescent assay.

23. The method of claim 22 wherein steps a and b are performed manually and steps c - h are performed automatically.

24. The method of claim 22 wherein all steps are performed automatically.

25. The method of claim 22 wherein one of said assay reagents comprises a fluorogenic agent.

26. The method of claim 22 wherein said analyzing step h includes the application of the algorithm outlined in Figure 1.

27. The method of claim 26 wherein said algorithm interacts directly with a computer processing unit (CPU).

28. The method of claim 22 wherein said solid support is a multiwell sample tray.

29. The method of claim 28 wherein said multiwell sample tray comprises a modified clear plastic sample tray.

30. The method of claim 29 wherein said modification comprises the opacification of a portion of the surface of said sample tray.

31. The method of claim 29 wherein said modification comprises the colorization of a portion of the surface of said sample tray.

32. The method of claim 22 wherein said predetermined conditions in step g comprise an incubation time of about 15 minutes to about 8 hours.

33. The method of claim 22 wherein said predetermined conditions in step g comprise an incubation time of about 15 minutes to about 16 hours.

34. The method of claim 22 wherein said assays are performed at a temperature of between about 25°C to about 37°C.

35. The method of claim 22 wherein the results of said turbidimetric assay are read visually or by a colorimeter.

36. The method of claim 22 wherein the results of said fluorescent assay are read using a fluorometer.

37. A method for accurately detecting fluorescent light energy from a single well within a clear plastic multi-well plate containing fluorescent substrates without interfering cross-talk between said wells, comprising the steps of:

a) inoculating said wells of said multi-well plate with a suspension containing an unknown material;

b) allowing said unknown material to react with said fluorescent substrates;

c) directing a beam of light at a wavelength between approximately 250 nm to approximately 420 nm into said wells of said multi-well plate;

d) reading the fluorescent light emitted from said wells of said multi-well plate using a reading frame optimized to only detect fluorescent light energy emitted from the well understudy.

38. The method of claim 37 further comprising a clear plastic plate having a top surface and a bottom surface wherein said top surface has been provided with an opage covering.

39. The method of claim 38 select from the group consisting of ink, dyes, and paint.

40. The method of claim 37 further comprising a clear plastic plate having wells with a top surface and a bottom surface, said top surface around each of said of said wells being provided with a solid color without modifying the well itself.

41. The method of claim 37 wherein said beam of light is at a wavelength of approximately 370 nm.

42. The method of claim 37 wherein said unknown material is a suspension of microorganisms.

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